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HW4

**For the current system:**

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|  | Repair Station | Inspection Station | Combined Station |
| Arrival Rate (per hour) | 0.2083 | 0.2083 | 0.0208 |
| Service Rate(per hour) | 0.25 | 0.3333 | 0.05 |
| Performance Measures: | | | |
| (utilization) | 0.833 | 0.625 | 0.416 |
| L ( mean number in system) | 4.995 | 1.666 | 0.712 |
| w (mean time in system) | 23.981 | 8 | 34.247 |
| wQ (mean time in queue) | 19.981 | 5 | 14.247 |
| LQ (mean number in queue) | 4.162 | 1.041 | 0.296 |
| P0 | 0.167 | 0.375 | 0.584 |
| Product Total time at Facility: 3.88 days | | | |

Table 1: Current System.

**For the proposed system:**

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| --- | --- | --- |
|  | Repair Station | Inspection Station |
| Arrival Rate(per hour) | 0.2315 | 0.2315 |
| Service Rate(per hour) | 0.25 | 0.333 |
| Performance Measures: | | |
| (utilization) | 0.926 | 0.695 |
| L ( mean number in system) | 12.514 | 2.274 |
| w (mean time in system) | 54.054 | 9.823 |
| wQ (mean time in queue) | 50.054 | 6.823 |
| LQ (mean number in queue) | 11.588 | 1.579 |
| P0 | 0.074 | 0.305 |
| Product total time at facility: 2.95 days | | |

Table 2: Proposed System

Using the current system as a state of reference, the proposed system will give the following changes in the long run: the mean number of products (L) in the repair station will go from 5 to 12.5, and the mean number of products in the queue for the repair station will also increase from 4.2 to 11.5. Similarly, for the inspection station, the mean number of products (L) will increase from 1.6 to 2.3 and the mean number of products in the queue(LQ) will go from 1.04 to 1.6.

Because of this, the proposed system will increase the utilization ) of the repair station from 83% to 93%, and the utilization () of the inspection station will go from 63% to 70%. Although the proposed system will increase the total time spent (w), and the total time spent in the queue (wQ) of the products in the repair and inspection stations, the proposed system will lower the total time a given product is at the facility and goes to the customer from 3.88 days to 2.95 days on average. Also, the probability that the combined station is not used (P0) is of 0.584, which is high, and a product in this station spends 34.25 hours on average which is also high. By all these performance measures, *Leviathan Limited is* recommended to replace their current system with the proposed system since the new systems uses the facility stations in a more efficient way.